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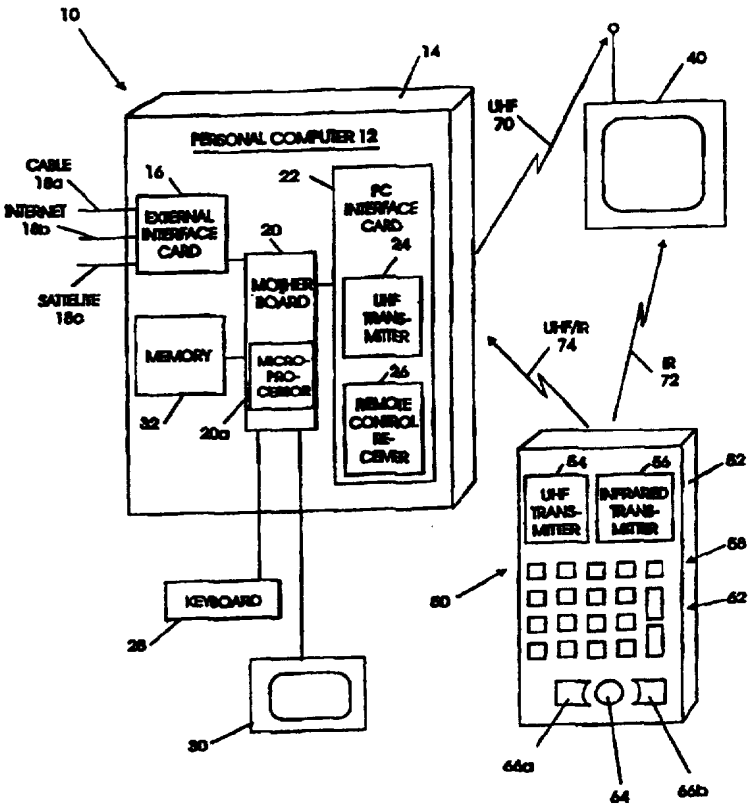
(57) Abstract

A personal computer is used to download and process auxiliary services which are intended for a television. Accordingly, information is provided to a television using a personal computer, so that the personal computer's processing power and memory may be used rather than stand-alone devices or a television memory. An external network interface is provided in the computer, as well as a low power television transmitter or transceiver. A unified television/personal computer remote control provides personal computer commands to the personal computer via radio frequency signals. Television commands may be provided to the television directly using infrared signals or indirectly through the personal computer using radio frequency signals. When television commands are provided using radio frequency signals, an infrared converter is provided for the television, to convert the radio frequency signals to infrared signals.



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METHODS AND SYSTEMS FOR PROVIDING INFORMATION TO A TELEVISION USING A PERSONAL COMPUTER

Field of the Invention

This invention relates to television systems and methods, and more particularly to remote control systems and methods for television.

Background of the Invention

The television (TV) has become ubiquitous in modern society. As a result, many additional services are being provided via television. One example of an additional service which is being provided via television is an online television program guide, wherein television program schedule information is displayed on a television for searching and selection by a television viewer. Online television program guides are described in U.S. Patent 4,751,578 to Reiter et al. entitled *"System for Electronically Controllably Viewing on a Television Updateable Television Programming Information"* and U.S. Patent 5,293,357 to Hallenbeck entitled *"Method and Apparatus for Controlling a Television Program Recording Device"* both of which are assigned to the assigned to the assignee of the present invention, the disclosures of both of which are hereby incorporated herein by reference. Other services which are being provided or have been proposed in connection with television include

interactive video, video games, online stock quotation and/or banking, and video-on-demand.

As a result of the proliferation of additional television services, a variety of accessory units, such as cable television descramblers, video game players, online television program guide receivers and satellite television receivers have been marketed. Unfortunately, these accessory units may be costly and may limit consumer acceptance of the additional services. As an alternative to accessory units, additional computing power and memory have been included in the television itself, for use with online television program guides and the like. Unfortunately, the added computing power and memory may increase the cost of the television itself.

Summary of the Invention

It is therefore an object of the invention to provide improved methods and systems for providing additional television services.

It is another object of the present invention to provide methods and systems for providing additional television services, without requiring costly add-on accessory units.

It is yet another object of the present invention to provide methods and systems for providing additional television services, without requiring computing power and memory to be added within a television.

These and other objects are provided, according to the present invention, by methods and systems which provide information to a television using a personal computer. The invention stems from the realization that

a large amount of computer power and memory is typically already present in the home, in the form of a personal computer. Accordingly, a personal computer is used to download and process auxiliary services which are intended for a television. The auxiliary services need not be downloaded and processed by an auxiliary unit or by the television itself.

In particular, according to the present invention, a personal computer includes a housing containing therein a processor and memory. A computer display is responsive to the processor. An external network interface is also contained in the housing, which obtains external information from an external network, such as cable television, satellite television, or the internet, and stores the external information in the memory. A low power television transmitter is also contained in the housing, which is responsive to the processor, to transmit information which is stored in the memory. A television remote control sensor is also contained in the housing. The remote control sensor is responsive to television remote control signals to control the processor and to manipulate data in the memory. Accordingly, information which is intended for a television may be downloaded into the personal computer via the external network interface and then transmitted to the television using the low power television transmitter. The television remote control sensor may be used to control the television and also to provide commands to the personal computer to process the information in the personal computer.

In a first embodiment of the present invention, the personal computer is used in combination with a unified television/personal computer remote control which transmits remote control commands to a television in response to user inputs and which also transmits personal computer commands to the television remote sensor in the housing in response to user inputs. The remote control commands which are transmitted to the television are preferably transmitted using infrared frequencies while the remote control commands which are transmitted to the personal computer may use infrared frequencies but are preferably radio frequencies (such as UHF) so that they may be transmitted from room to room without requiring direct line of sight.

In another embodiment according to the invention, the remote control may be a radio frequency (UHF) remote control, which transmits personal computer commands and television remote control signals to the personal computer in response to user inputs. In this embodiment, a television interface unit may also be provided. The television interface unit includes a radio frequency receiver which receives television video signals from the personal computer and which also receives television remote control commands from the personal computer. The television interface unit also includes a converter which is responsive to the radio frequency receiver and which converts the received television remote control commands into infrared television remote control commands. Accordingly, the remote control need not communicate directly with the TV, but may communicate with the TV via the personal computer. An all-UHF remote control may

thereby be provided which does not require line of sight operation to the television or to the personal computer.

The second embodiment of the present invention preferably includes a personal computer interface, a television interface and a wireless remote control. The personal computer interface is adapted for use with a personal computer and includes a radio frequency transceiver which transmits and receives television remote control signals and which also transmits television video signals which are generated in a personal computer. The television interface is adapted for use with a television. It includes a radio frequency receiver which receives television remote control signals and television video signals from the personal computer interface. The television interface applies the received television video signals to a television for display and also converts the received television remote control signals into infrared television remote control signals.

The wireless remote control includes a user interface which accepts user input commands to remotely control a television. The wireless remote control also includes a radio frequency transmitter which transmits radio frequency remote control signals to a personal computer to remotely control a television in response to user input commands at the user interface. The personal computer interface may also relay received television remote control signals to the personal computer for processing in the personal computer, and may receive television remote control signals from the personal computer. The personal computer interface also receives personal computer commands from the radio frequency

transceiver and relays the personal computer commands to a personal computer.

In a preferred embodiment, the personal computer interface is contained on a card which connects to a personal computer motherboard in a personal computer housing. Also in a preferred embodiment, the television interface also includes a radio frequency switch which switches the video input to a television between the received television video signals and an external video source. Also preferably, the wireless remote control user interface also accepts user input commands to remotely control the personal computer. The UHF transmitter also transmits UHF personal computer control signals to a personal computer, to remotely control a personal computer in response to user input commands at the user interface. An online television program guide or other television accessory service may be implemented by software which executes on the personal computer.

Two embodiments of wireless remote controls may be provided according to the present invention. In a first embodiment, a remote control housing includes a user interface, a radio frequency transmitter and an infrared transmitter. The user interface accepts user input commands. The radio frequency transmitter transmits radio frequency remote control signals in response to user input commands at the user interface. The infrared transmitter transmits infrared remote control signals in response to user input commands at the user interface. The user interface preferably includes a plurality of keys, with the radio frequency transmitter being responsive to activation of at least one of the keys and

the infrared transmitter being responsive to activation of at least one of the keys. The radio frequency transmitter and the infrared transmitter may both be responsive to activation of at least one of the keys.

The user interface may also include a trackball, and the radio frequency transmitter may be responsive to activation and movement of the trackball. The user interface may also include a television program guide activation key, so that the radio frequency transmitter is responsive to activation of the television program guide activation key to transmit a command to a personal computer to activate a television program guide in the personal computer, and the infrared transmitter is responsive to activation of the television program guide activation key to transmit a command to a television to tune into a television channel which will receive the television program guide from the personal computer.

A second embodiment of a wireless remote control includes a remote control housing, a user interface in the housing and a radio frequency transmitter in the housing. The user interface accepts user input commands to remotely control a personal computer and to remotely control a television. The radio frequency transmitter transmits radio frequency remote control signals to remotely control a personal computer and to remotely control a television in response to user input commands at the user interface. Preferably, the user interface includes a plurality of keys, including personal computer remote control keys and television remote control keys. The radio frequency transmitter is responsive to activation of the personal computer keys to transmit

personal computer remote control commands and is responsive to activation of the television remote control keys to transmit television remote control commands.

A first method of interfacing a personal computer with a television includes the steps of obtaining at the personal computer, external information from an external network and storing the external information in personal computer memory. Remote control signals are wirelessly received at the personal computer in response to user inputs at a wireless remote control. Information is wirelessly transmitted from the personal computer memory to a television in response to the user inputs which are wirelessly received at the personal computer. The information from the personal computer may also include television program video signals for the television. The remote control signals which are received at the personal computer may be infrared television remote control signals or radio frequency signals.

In a second method according to the present invention, a television is remotely controlled by accepting user input commands to remotely control a television, from a wireless remote control. Radio frequency remote control signals are transmitted from the wireless remote control to a personal computer. The radio frequency remote control signals are received at the personal computer. Television remote control signals and television video signals are transmitted from the personal computer to a television. The received television video signals are applied to the television for display. The received television remote control

signals are converted into infrared television remote control signals to control the television.

Accordingly, the computer power and memory of the personal computer are used to provide additional services and remote control for a television. Expensive add-on units and/or expensive televisions, which contain high powered computer processing and memory, are thereby rendered unnecessary.

Brief Description of the Drawings

Figure 1 illustrates a first embodiment of a system for providing information to a television using a personal computer according to the present invention.

Figure 2 is a flowchart illustrating operations of the system of Figure 1.

Figure 3 illustrates an example of a television screen which may be used during the operations of Figure 2.

Figure 4 illustrates a second embodiment of a system for providing information to a television using a personal computer according to the present invention.

Detailed Description of Preferred Embodiments

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the

scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

Referring now to Figure 1, a first embodiment of a system for providing information to a television using a personal computer is illustrated. As shown in Figure 1, system **10** includes a personal computer **12**, a television **40** and a wireless remote control **50**. Personal computer **12** includes a personal computer housing **14** and a motherboard **20**. The motherboard may include a processor **20a** thereon. A keyboard **28**, display **30** and other conventional personal computer hardware and software may be included. Memory **32**, in the form of semiconductor memory (DRAM, SRAM, EEPROM, etc.), magnetic memory (floppy and hard disk drives), optical memory (CDROM) and other conventional memory may be provided.

Personal computer **12** also includes an external interface card **16** which may plug into motherboard **20** and which obtains external information from external networks such as cable TV network **18a**, internet **18b** and satellite TV network **18c**. Personal computer **12** also includes a PC interface card **22** which may also plug into motherboard **20**. PC interface card **22** includes a radio frequency (preferably UHF) transmitter **24** and a remote control receiver **26**. External interface card **16** and PC interface card **22** may be combined into a single card.

UHF transmitter **24** transmits information as UHF signals **70** to TV **40**. The UHF signals may be a conventional television program which is obtained from cable interface **18a** or satellite interface **18c**, or may be internet data from internet interface **18b**. This information may be passed directly to UHF transmitter **24**

from external interface card **16**. Alternatively, some or all of this information may be stored in memory **32** and then transmitted to TV **40** under remote control or under control of the personal computer as will be described below. The design of the individual component parts of personal computer **12** are well known to those having skill in the art and need not be described in greater detail herein.

Still referring to Figure 1, wireless remote control **50** includes a remote control housing **52** and a user interface in the housing which accepts user input commands. As shown in Figure 1, the user interface includes a plurality of keys **58** and **62**, a trackball **64** and trackball keys **66a** and **66b**, as will be described in detail below. However, it will be understood by those having skill in the art that other user inputs may be provided via touch screen, voice activation and the like.

Wireless remote control **50** also includes a radio frequency (preferably UHF) transmitter **54** which transmits UHF remote control signals **74** to personal computer **12** in response to user input commands at the user interface. Accordingly, UHF transmitter **24** and remote control receiver **26** may be combined into a single radio frequency (UHF) transceiver. An infrared transmitter **56** in the housing **52**, transmits infrared remote control signals **72** to the television in response to user input commands at the user interface. In another embodiment, a UHF transmitter **54** is not included, and infrared commands **74** are transmitted to the personal computer. In this embodiment, the remote control receiver **26** in the personal computer is an infrared receiver.

In the embodiment of Figure 1, remote control **50** is capable of operating certain keys in the infrared mode and other keys in the UHF mode. Some keys may operate in both modes. In the embodiment shown in Figure 1, top keys **58** operate both the UHF transmitter **54** and the infrared transmitter **56**. Middle keys **62** operate the infrared transmitter only, and the trackball **64** and trackball keys **66a**, **66b** operate the UHF transmitter **54** only. It will be understood that the positioning of the keys can vary, so that top keys **58** will also be referred to as "combined keys" and middle keys **62** will be referred to as "infrared keys".

The infrared keys **62** are capable of emulating a broad range of conventional television remote control commands. In effect, these keys function as a "smart remote" that is capable of either learning the television's remote control commands or being designed to be compatible with a particular television **40**. The trackball and trackball keys **64**, **66a** and **66b** are used to communicate directly with the personal computer, for example to call up online television programming guide software and manipulate the online television program guide by cursor movement on screen. The combined keys **58** send both an infrared signal to the TV and a UHF signal to the personal computer.

Operation of the system **10** of Figure 1 in connection with an online television program guide will now be described. The general concept of an online television program guide is described in the aforesaid U.S. Patents 4,751,578 and 5,293,357 and will not be described in detail herein.

Referring to Figure 2, operations begin at Block **102** by receiving, processing and storing online television program guide information. The information may be received from cable **18a**, internet **18b**, satellite **18c** or other external systems via external interface card, and may be processed by the processor **20a** on motherboard **20** and stored in memory **32**.

At Block **104**, the online television guide is activated, for example by user activation of one of the combined keys **58**. Activation of the combined key sends a UHF signal **74** to remote control receiver **26** to activate the guide in the personal computer **12**. An infrared signal **72** is also sent to the television **40** to select the appropriate channel, such as channel 2. Depressing another key of the combined keys **58** may also turn the television back to the channel being viewed and deactivate the online television guide software in the computer.

Referring to Block **106**, the online television guide is manipulated. For example, after activating the online guide, a television screen as shown in Figure 3 may be displayed. The user may use the trackball **64** and trackball keys **66a** and **66b** to move a cursor on the screen to select a title to be viewed or to select other options for the online guide. The trackball **64** may be used to move the cursor on the screen to an appropriate box. The left click key **66a** may be used to activate the function and may be activated a second time to return. Alternatively, if the left click key is activated on a title, the descriptions may be displayed. The click

right key **66b** may be used to select a channel and deactivate the guide.

Finally, at Block **108**, a television program is selected. In order to select the program, the trackball **64** and left click button **66a** may be used to move and activate the cursor on the screen. Upon selection of a program, the personal computer software supplies the appropriate channel to television **40** via UHF signal **70**. The television may also need to be tuned to that channel by depressing the appropriate infrared key **62** for the channel, to thereby cause infrared command **72** to be transmitted to the television.

Due to the long turn-on or "boot" time, it may desirable to leave the personal computer **12** online for instantaneous use with the television. Otherwise, there may be significant delays while the software is brought up. A shut-down function may be required if the user wants to disable the software from the television room. Alternatively, the personal computer user may turn off the online guide at the personal computer if desired. The trackball operates like a mouse on a personal computer, to enable the user to move the cursor to appropriate places on the television screen and to activate the appropriate function. The trackball may reduce the number of keys on the remote control unit **50**, and the user need not search for special functions on the remote control in a dimly lit room.

Accordingly, the embodiment of Figure 1 allows an inexpensive card or cards to be added to a personal computer, to thereby allow the personal computer to control television. Expensive add-on boxes need not be

provided, which would merely duplicate the computing power and memory which is already available in the personal computer.

The embodiment of Figure 1 may require the user to separately tune the television channel using infrared signal **72**, and separately control the personal computer using UHF or infrared commands **74**. In a second embodiment of the invention, described in Figure 4, the personal computer may control tuning and other television functions using UHF television commands so that the user need not provide separate commands to the television. However, the embodiment of Figure 4 may require a separate television interface unit which converts received UHF television commands to infrared television commands.

As shown in Figure 4, system **100** includes a personal computer **12** as already described. However, PC interface card **22** includes a radio frequency (preferably UHF) transceiver, i.e. a UHF transmitter/receiver **24'** which both receives UHF signals from remote control unit **50'** and transmits UHF signals to television interface unit **200**. Remote control unit **50'** only includes a UHF transmitter **54** but does not include an infrared transmitter. Activation of the combined keys **58**, the conventional television keys **52** and the personal computer keys **64**, **66a**, **66b** are all communicated to the personal computer **12** via UHF signals. The television commands from keys **58** and **62** are communicated as UHF television commands **74a**, and the personal computer commands from keys **58** and keys **64**, **66a** and **66b** are communicated as PC commands **74b**.

Still referring to Figure 4, television interface **200** includes a television interface housing **202**. A UHF receiver **204** in the housing receives television remote control signals **70b** and television video signals **70a** from the personal computer interface **22**. The received television video signals are supplied to television **40** for display via video line **214**, video switch **208** and UHF input **220**. Video switch **208** may also be used to switch between conventional cable **212a** and satellite **212b**. UHF receiver **204** also supplies the television commands to an infrared converter **206** via line **216**. Infrared converter **206** converts the received television remote control signals into infrared television remote control signals **218** for controlling the television in a conventional manner.

Accordingly, as shown in Figure 4, the system **100** allows the computer to do more than just provide listings of data. The computer can select a program from an online television program guide and also direct the TV set to tune to the appropriate channel.

Operations of the system **100** of Figure 4 may proceed as already described in connection with Figure 2. However, the remote control unit **50'** has the ability to control the online guide via the personal computer and to control the television via the personal computer instead of remote controlling the television directly. Accordingly, when the guide is activated at Block **104**, the UHF transmitter **54** can transmit an activate guide signal and the personal computer can generate a signal to activate the online television program guide within the personal computer and tune the television to the

requisite channel. The guide may be manipulated as already described at Block **106**. At Block **108**, when a television program is selected by moving the cursor on the television display, the personal computer provides the appropriate video signal **70a** and appropriate TV commands **70b** to tune the television.

For example, a "What's on Now?" key may send a UHF signal to the personal computer interface card which communicates with the PC to activate the online television program guide and display the current time slot listings. The PC interface transmits the displayed listings to the television at low power and also instructs the television to switch to the designated channel to view the program listings. After the viewer selects a program of interest using the trackball and trackball keys, the personal computer and the UHF transceiver **24'** send a signal to the PC interface card which deactivates the listing display. A UHF signal is sent to the television interface unit which translates the signal to an infrared signal which is recognized by the TV and which changes the channel to the desired program. The program may be received via the cable, internet or satellite interface **18a**, **18b**, **18c** respectively at the personal computer external interface card **16**, or via the satellite or cable interface **212a**, **212b** respectively of the television interface unit. For reception by the personal computer, a television tuner card may need to be installed.

Accordingly, the embodiment of Figure 4 remotely controls the television by accepting user input commands to remotely control a television from a wireless remote

control, and transmits UHF remote control signal from the wireless remote control to a personal computer. The UHF remote control signals are received at the personal computer. They may be processed by the personal computer. Television remote control signals and television video signals are then transmitted from the personal computer to a television. The received television video signals are applied to the television for display. The received television remote control signals are converted into infrared television remote control signals to control the television. Personal computer commands may be transmitted from the wireless remote control to the personal computer.

Other design considerations for the present invention will now be described. The UHF remote control **50** and **50'** preferably transmits on radio frequencies in order to extend the range to other rooms in the home. Specifically, the personal computer may not be located in the same room as the TV **40**. It is generally preferable for the remote control unit **50**, **50'** to be located within a line of sight of the TV so that the viewer may view the TV while operating a remote control. Therefore, to communicate with the personal computer **12**, radio signals are preferred. UHF is preferred because UHF frequencies have been set aside by the Federal Communications Commission for remote control applications.

The PC interface card **22** also preferably includes the necessary functionality to demodulate the signals coming from the remote control, and to convert them into a format which is recognizable by a personal computer operating system. The UHF transceiver transmits the

instructions from the personal computer as initiated by the viewer using the UHF remote control and transmits them to the infrared converter. The UHF transceiver **24'** also takes the video display listings and modulates them onto a UHF carrier to be transmitted to the UHF television receiver for display on the TV screen.

The television interface unit includes a UHF receiver **204**, an infrared converter **206** and a video switch **208**. The UHF receiver detects and demodulates the control codes transmitted by the PC interface to control the TV functions and listing displays. The infrared converter decodes the control codes and retransmits them as infrared signals compatible with the TV set. The video switch **208** controls the selection of the incoming cable TV, off-air TV or satellite TV and also may control orientation of a remote antenna for reception.

A software package is preferably loaded onto the personal computer and uses the personal computer's processor and memory. The software may include TV listing and schedule downloading software and TV interface command software. The TV listing and schedule downloading software may include functionality to dial up a service provider and download the required listings and descriptions, selecting only the services the particular viewer receives or desires for the viewer's particular geographic area. The software may ask the viewer to input a zip code and designate whether cable, over-the-air and/or satellite services are desired. From that information, the software may download the appropriate listings for the viewer. The viewer is also capable of selectively deleting particular channels or subject

matter in which there is no interest. Thus, the viewer can customize the listings to the viewer's particular requirements, including such options as how many days of listings to display, in what order to display the listings, the type of display (grid style or rolling log), what additional information is desired (such as movie reviews, sports scores, financial reports, stock quotes and general editorial).

The software also can download remote control codes for television, thus enabling the viewer to control the particular television with the system's UHF hand-held remote control. All known codes may be maintained in a database accessible by the viewer. These codes may enable operation of any television, satellite receivers or VCRs. The software may provide many other types of additional services such as descrambling, interactive video and the like.

Accordingly, the present invention allows the personal computer's full processing power and memory to be used to control a television, with the addition of an external interface card and PC interface card to a personal computer. A special remote control **50** or **55** may also be required and a television interface unit **200** may also be required. The external interface card **16**, PC interface card **22**, remote control **50**, **50'** and television interface unit **200** do not require much or any computer processing power or memory, and accordingly may be produced inexpensively. The power of the personal computer may thereby used to control the television, thus obviating the need to duplicate some or all of the computer processing power memory in online television

program guide boxes, satellite television receiver boxes, interactive video game boxes and the like.

In the drawings and specification, there have been disclosed typical preferred embodiments of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the following claims.

THAT WHICH IS CLAIMED:

1. A personal computer comprising:

a housing containing therein a processor and memory;

a display responsive to the processor;

an external network interface in the housing, which obtains external information from an external network and stores the external information in the memory;

a low power television transmitter in the housing, which is responsive to the processor, to transmit information which is stored in the memory; and

a television remote control sensor in the housing, which is responsive to television remote control signals, to control the processor and manipulate information in the memory.

2. A personal computer according to Claim 1 wherein the external network interface comprises at least one of a cable television interface, a satellite television interface and an internet interface.

3. A personal computer according to Claim 1 wherein the low power television transmitter comprises a low power radio frequency television transmitter which transmits television video signals to the television under control of the processor.

4. A personal computer according to Claim 1 wherein the television remote control sensor is an infrared television remote control sensor.

5. A personal computer according to Claim 1 wherein the external information is television program guide information.

6. A personal computer according to Claim 1 in combination with a unified television/personal computer remote control, which transmits remote control commands to a television in response to user inputs, and which also transmits personal computer commands to the television remote sensor in the housing, in response to user inputs.

7. A personal computer according to Claim 1 wherein the television remote control sensor is a radio frequency television remote control sensor in the housing.

8. A personal computer according to Claim 1 in combination with a radio frequency remote control, which transmits personal computer commands and television remote control signals to the personal computer in response to user inputs.

9. A personal computer according to Claim 9 in further combination with a television interface unit, the television interface unit comprising:

a radio frequency receiver which receives television video signals from the personal computer and which also receives television remote control commands from the personal computer; and

a converter which is responsive to the radio frequency receiver, and which converts the received television remote control commands into infrared television remote control commands.

10. A personal computer according to Claim 1 wherein the television transmitter is also responsive to the processor, to transmit information directly from the external network interface.

11. A method of interfacing a personal computer with a television, comprising the steps of:

obtaining at the personal computer, external information from an external network;

storing the external information in personal computer memory;

wirelessly receiving remote control signals at the personal computer, in response to user inputs at a wireless remote control; and

wirelessly transmitting information from the personal computer memory to a television in response to the user inputs which are wirelessly received at the personal computer.

12. A method according to Claim 11 wherein the obtaining step comprises the step of obtaining external information from at least one of a cable television network, a satellite television network and the internet.

13. A method according to Claim 11 wherein the step of wirelessly transmitting comprises the step of

wirelessly transmitting television video signals to the television.

14. A method according to Claim 11 wherein the wirelessly receiving step comprises the step of receiving infrared television remote control signals.

15. A method according to Claim 11 wherein the obtaining step comprises the step of obtaining television program guide information from an external network.

16. A method according to Claim 11 further comprising the step of:

wirelessly transmitting control signals from the wireless remote control to the television, in response to user inputs at the wireless remote control.

17. A method according to Claim 11:

wherein the step of wirelessly receiving comprises the step of wirelessly receiving radio frequency television remote control signals at the personal computer; and

wherein the step of wirelessly transmitting comprises the step of wirelessly transmitting radio frequency signals representing information from the personal computer and television remote control signals which were received at the personal computer.

18. A method according to Claim 17 further comprising the steps of:

receiving at a remote unit, the transmitted radio frequency signals representing information from the personal computer and the television remote control signals which were received at the personal computer;

applying the received information from the personal computer to a television; and

converting the television remote control signals to infrared television remote control signals.

19. A method of controlling a television comprising the step of:

using a personal computer to process and relay information from external networks to a television.

20. A method according to Claim 19 wherein the using step comprises the step of:

using a personal computer to process and wirelessly relay information from external networks to a television.

21. A wireless remote control comprising:

a housing;

a user interface in the housing, which accepts user input commands;

a radio frequency transmitter in the housing, which transmits radio frequency remote control signals in response to user input commands at the user interface; and

an infrared transmitter in the housing, which transmits infrared remote control signals in response to user input commands at the user interface.

22. A wireless remote control according to Claim 21 wherein the user interface includes a plurality of keys, the radio frequency transmitter being responsive to activation of at least one of the keys, and the infrared transmitter being responsive to activation of at least one of the keys.

23. A wireless remote control according to Claim 22 wherein the radio frequency transmitter and the infrared transmitter are both responsive to activation of at least one of the keys.

24. A wireless remote control according to Claim 23 wherein the user interface includes a trackball, and wherein the radio frequency transmitter is responsive to activation of the trackball.

25. A wireless remote control according to Claim 21:

wherein the user interface includes a television program guide activation key;

wherein the radio frequency transmitter is responsive to activation of the television program guide activation key, to transmit a command to a personal computer to activate a television program guide in the personal computer; and

wherein the infrared transmitter is responsive to activation of the television program guide activation key, to transmit a command to a television to tune into a television channel which will receive the television program guide from the personal computer.

26. A wireless remote control comprising:

a housing;

a user interface in the housing, which accepts user input commands to remotely control a personal computer and to remotely control a television; and

a radio frequency transmitter in the housing, which transmits radio frequency remote control signals to remotely control a personal computer and to remotely control a television, in response to user input commands at the user interface.

27. A wireless remote control according to Claim 26 wherein the user interface includes a plurality of keys, including personal computer remote control keys and television remote control keys, the radio frequency transmitter being responsive to activation of the personal computer keys to transmit personal computer remote control commands and being responsive to activation of the television remote control keys to transmit television remote control commands.

28. A system for remotely controlling a television comprising:

a personal computer interface, adapted for use with a personal computer, and including a radio frequency transceiver which receives television remote control signals and transmits television remote control signals, and which transmits television video signals which are generated in a personal computer;

a television interface, adapted for use with a television, and including a radio frequency receiver

which receives television remote control signals and television video signals from the personal computer interface, which applies the received television video signals to a television for display, and which converts the received television remote control signals into infrared television remote control signals; and

a wireless remote control, including a user interface which accepts user input commands to remotely control a television, and a radio frequency transmitter which transmits radio frequency remote control signals to a personal computer to remotely control a television in response to user input commands at the user interface.

29. A system according to Claim 28 wherein the personal computer interface also relays received television remote control signals to the personal computer, and receives television remote control signals from the personal computer.

30. A system according to Claim 29 wherein the personal computer interface also receives personal computer commands from the radio frequency transceiver, and relays the personal computer commands to a personal computer.

31. A system according to Claim 28 wherein the personal computer interface is contained on a card which connects to a personal computer motherboard in a personal computer housing.

32. A system according to Claim 28 wherein the television interface further comprises a radio frequency switch which switches the video input to a television, between the received television video signals and an external video source.

33. A system according to Claim 28 wherein the wireless remote control user interface also accepts user input commands to remotely control a personal computer, and wherein the radio frequency transmitter also transmits radio frequency personal computer control signals to a personal computer to remotely control a personal computer in response to user input commands at the user interface.

34. A system according to Claim 28 further comprising:

a software module which executes on a personal computer and which implements an online television program guide.

35. A personal computer interface for remotely controlling a television comprising:

a radio frequency transceiver which receives television remote control signals and transmits television remote control signals, and which transmits television video signals which are generated in a personal computer; and

an external network interface which obtains external information from an external network, and stores the external information in the personal computer.

36. An interface according to Claim 35 wherein the personal computer interface also relays received television remote control signals to the personal computer, and receives television remote control signals from the personal computer.

37. An interface according to Claim 35 wherein the personal computer interface also receives personal computer commands from the radio frequency transceiver, and relays the personal computer commands to a personal computer.

38. An interface according to Claim 35 wherein the radio frequency transceiver and the external network interface are contained on a card which connects to a personal computer motherboard in a personal computer housing.

39. A method for remotely controlling a television comprising the steps of:

accepting user input commands to remotely control a television, from a wireless remote control;

transmitting radio frequency remote control signals from the wireless remote control to a personal computer;

receiving the radio frequency remote control signals at the personal computer;

transmitting television remote control signals and television video signals from the personal computer to a television;

applying the received television video signals to the television for display; and

converting the received television remote control signals into infrared television remote control signals to control the television.

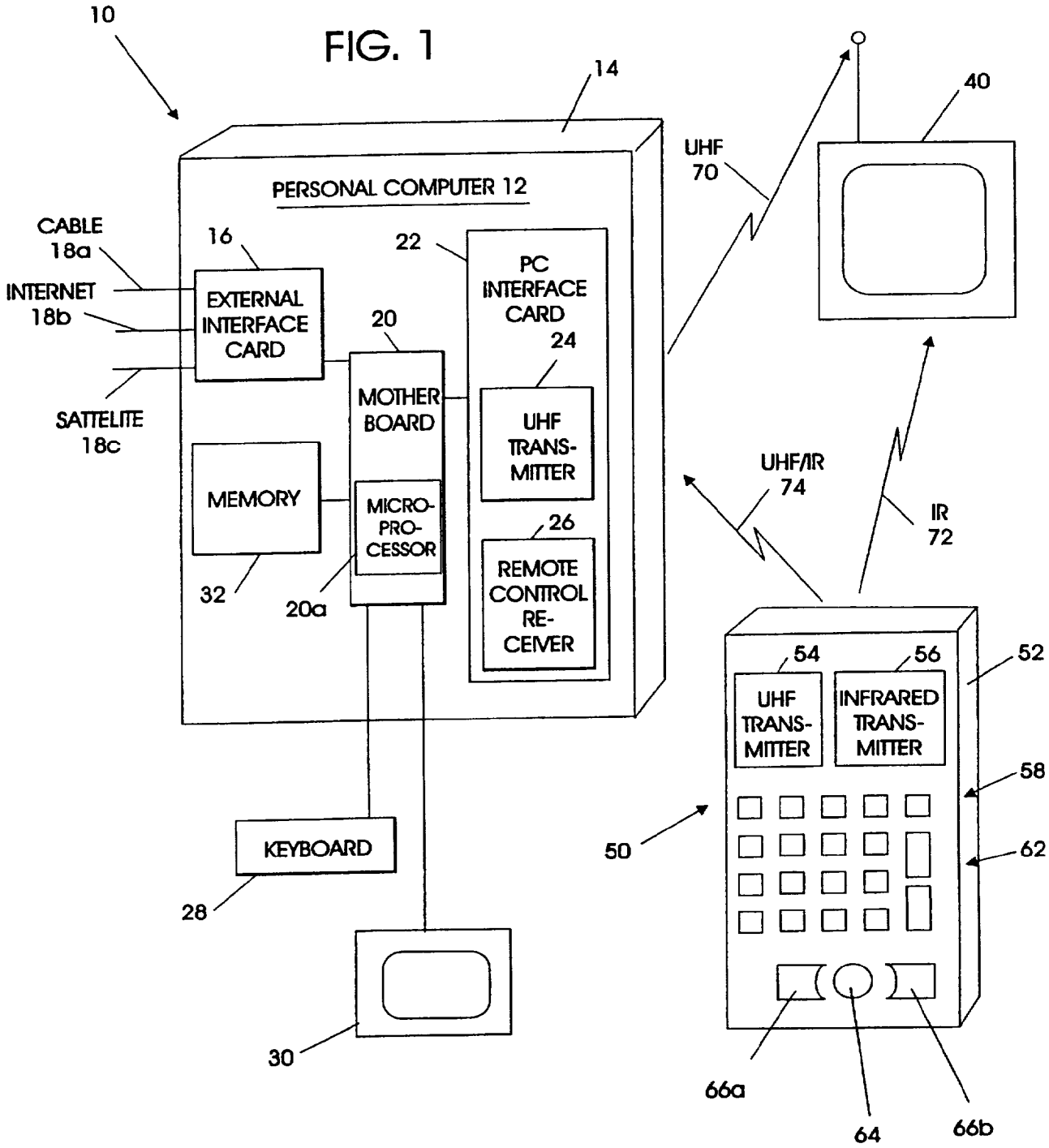
40. A method according to Claim 39 further comprising the step of:

transmitting personal computer commands from the wireless remote control to the personal computer.

41. A method according to Claim 40 further comprising the step of:

switching the video input to the television, between the received television video signals and an external video source.

FIG. 1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INTERNET 18b
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PC INTERFACE CARD
24
20
MOTHER BOARD
UHF TRANS-MITTER
MEMORY
MICRO-PRO-CESSOR
26
REMOTE CONTROL RE-CEIVER
32
20a
KEYBOARD
28
30
UHF 70
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INFRARED TRANS-MITTER
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66a
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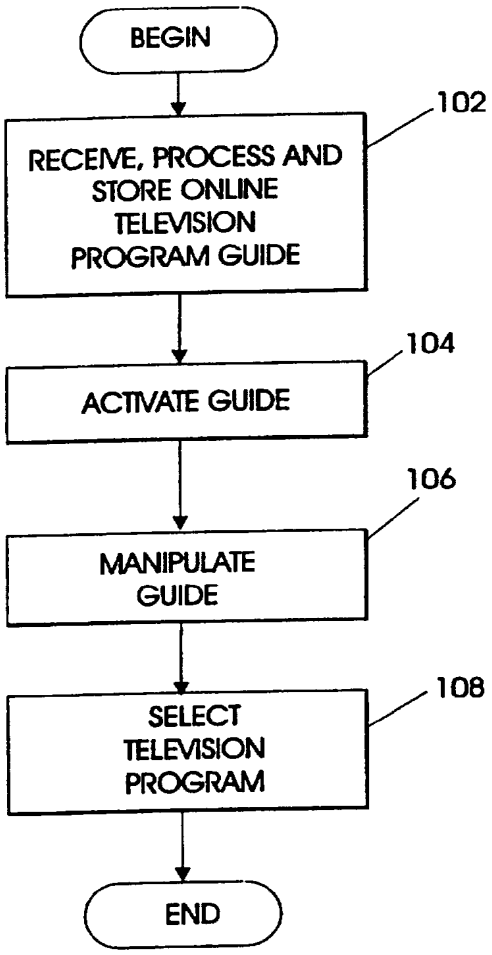
66b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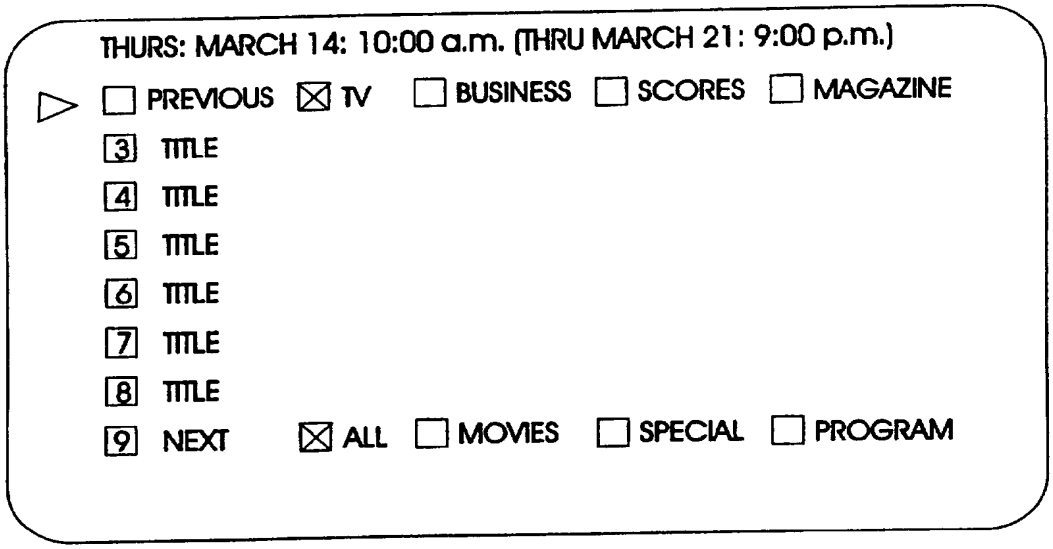
102
ACTIVATE GUIDE
104
MANIPULATE GUIDE
106
SELECT TELEVISION PROGRAM
108
END

FIG. 2

FIG. 3


THURS: MARCH 14: 10:00 a.m. (THRU MARCH 21: 9:00 p.m.)
PREVIOUS
TV
BUSINESS
SCORES
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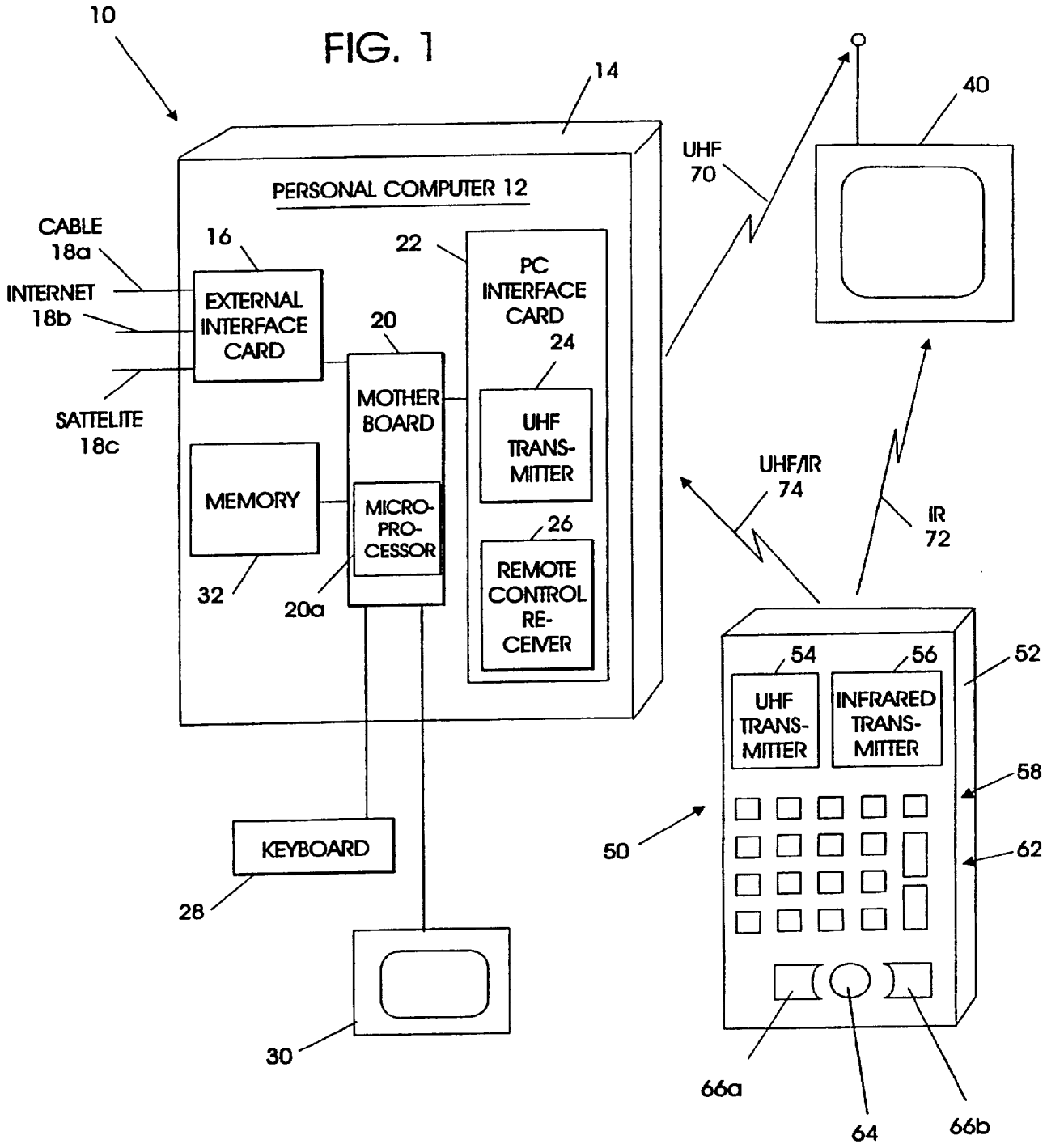
4 TITLE
5 TITLE
6 TITLE
7 TITLE
8 TITLE
9 NEXT
ALL
MOVIES
SPECIAL
PROGRAM

FIG. 1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14
PERSONAL COMPUTER 12
CABLE
18a
INTERNET
18b
SATTELITE
18c
16
EXTERNAL INTERFACE CARD
22
PC INTERFACE CARD
24
UHF TRANS-MITTER
26
REMOTE CONTROL RE-CEIVER
20
MOTHER BOARD
MICRO-PRO-CESSOR
20a
MEMORY
32
KEYBOARD
28
30
UHF
70
40
UHF/IR
74
IR
72
50
54
UHF TRANS-MITTER
56
INFRARED TRANS-MITTER
52
58
62
66a
64
66b

INTERNATIONAL SEARCH REPORT

Inter ...nal Application No
PCT/US 97/12166

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04N5/445 H04N7/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04N

Documentation searched other than minimum documentation to the extent that such documents are inoluded in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 706 121 A (YOUNG PATRICK) 10 November 1987	1-8, 10-18, 25-31
X	see column 6, line 18 - column 10, line 10 see column 21, line 48 - column 22, line 25 see figures 1-5	19,20

Y	US 5 101 499 A (STRECK DONALD A ET AL) 31 March 1992	1-8, 10-18, 25-31
X	see column 5, line 54 - column 7, line 16 see column 8, line 50 - column 10, line 17 see column 11, line 30 - column 12, line 4 see figures 9,11,15,16 see figures 22-24	21-23

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
4 November 1997	11. 11. 97

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Van der Zaal, R

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INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/US 97/12166

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 339 095 A (REDFORD PETER M) 16 August 1994 see column 3, line 23 - column 5, line 24 see column 9, line 40 - column 51 see figures 1-4,8	21-24, 26,27
A	US 4 751 578 A (REITER ELI ET AL) 14 June 1988 cited in the application see the whole document	1-41

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter. nal Application No
PCT/US 97/12166

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 5101499 A	31-03-92	US 4916532 A	10-04-90
		US 5012350 A	30-04-91
		US 5045948 A	03-09-91
		US 5023931 A,B	11-06-91
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		US 5650608 A	22-07-97
US 4751578 A	14-06-88	NONE	